Ali Ladman

**Grade**: 4

**Topic**: The Water Cycle

**Time**: 30 minutes preparation, one class period duration

**Justification**:

As part of the fourth grade curriculum, students will be able to describe the water cycle. To go deeper into this process, each student will demonstrate the different stages and describe through observation how water is recycled. The main teaching point is that water is reused and recycled many times, naturally, and how water changes forms to move from one place to another.

**Standards**: Describe the Water Cycle.

Students:

PS 2.1c: Water is recycled by natural processes on Earth.

• evaporation: changing of water (liquid) into water vapor (gas)

• condensation: changing of water vapor (gas) into water (liquid)

• precipitation: rain, sleet, snow, hail

• runoff: water flowing on Earth’s surface

• groundwater: water that moves downward into the ground

LE 6.2 c: Heat energy from the sun powers the water cycle.

Teacher:

1e: Designing Coherent Instruction

* Lessons that support instructional outcomes and reflect important concepts
* Activities that represent high-level thinking
* The use of varied resources
* Thoughtfully planned learning groups
* Structured lesson plan

3c: Engaging Students in Learning

* Activities aligned with the goals of the lesson
* Student enthusiasm, interest, thinking, problem-solving, etc
* Learning tasks that require high-level student thinking and are aligned with lesson objectives
* Students highly motivated to work on all tasks and are persistent even when the tasks are challenging
* Students actively “working,” rather than watching while their teacher “works.”
* Suitable pacing of the lesson: neither dragging nor rushed, with time for closure and student reflection

**Materials:**

* Small chalkboard
* sponge
* ice
* glass of ice water
* 3 2-liter soda bottles (emptied with labels removed)
* warm water
* desk lamp
* tape

**Summary:**

Students will learn about the water cycle by completing an experiment, singing a song with hand motions, and illustrating pictures.

**Objectives:**

1. Students will conduct an experiment to demonstrate the processes of the water cycle.
2. Students will be able to explain evaporation, condensation, and precipitation and their roles in the water cycle.

**Lesson Instructions**

**Opening:** “Have you ever wondered about where water comes from?”  Explain that water is not new water, but has been used millions of times before.  All water is recycled.

**Core Activities:**

1. Dip sponge in water.  Rub the sponge on the chalkboard.  Ask a volunteer to blow on the water spot.  Ask, “What is happening to the water?” **Anticipated student response:** The spot is going away.  It is disappearing.
2. Explain that the water is turning into water vapor and disappearing.  The water is turning from a liquid to a gas.  This is called evaporation.  Write evaporation on the board.
3. Walk around the room with a glass of ice water.  Have the students touch the glass when you reach their table.  Ask them what they notice about the glass of ice water.  What does it feel like?
4. Ask, “Does my glass have a hole in it?  Is it leaking?”  Explain to students that the water vapor is all around us.  When the water vapor touches something cold, it turns back into water.
5. Explain that when water vapor gets cold in the air, it huddles together and forms a cloud.  This is called condensation.  Write condensation on the board.
6. When the cloud gets too heavy, it will rain, snow, or hail.  This is called precipitation.  Write precipitation on board.
7. Say, “Now we are going to conduct an experiment.”
8. Place a 2-liter soda bottle with the top cut off, along with the separated top portion, at tables 1, 3, and 5.  Instruct students to keep their hands off the materials until given instructions to do so.
9. Pour one cup of warm water into each 2-liter soda bottle.  Be very clear that the students should not be touching the bottle yet.
10. The teacher will now model attaching the funnel portion of the soda bottle upside down into the cylinder of the soda bottle.  The teacher will use tape to adhere the two pieces together.  The teacher will direct one student from each table to hold the bottle still and another student to tape the bottle. (If students have difficulty with the task, the teacher can tape all of the bottles)
11. Instruct one student from each table to carefully carry their bottle over to the small desk lamp set up on a spare desk.  The bottles will sit under the lamp for 5 minutes.
12. Ask the students, “What do you think will happen to the air temperature inside the bottle after it is exposed to the lamp?  Why?”

**While waiting for the bottles to be under the lamps for 5 minutes, teach the students the *Water Cycle* song:**

(Sang to the tune of She'll Be Coming Around the Mountain)

Water travels in a cycle, yes it does   
(use pointer finger to make a big circle)

Water travels in a cycle, yes it does  
(repeat finger circle)

It goes up as evaporation  
(moves hands up to the sky)

Forms clouds as condensation  
(make a cloud overhead with arms)

Then comes down as precipitation, yes it does!  
(sprinkle with fingers while bringing arms down in front of you)

1. After waiting 5 minutes, instruct one student from each group to retrieve their group’s soda bottle.  Teacher will tell students to pay special attention to the inside of the cylinder and the bottom of the funnel.  Students will be given one minute to look at the soda bottles.  Students will discuss their observations with the people at their table and then record their observations in their notebooks.  Students will illustrate their findings and use the vocabulary words to describe their illustrations.
   1. In the meantime, the teacher will put the soda bottles back under the lamp.  The teacher will place 2-3 ice cubes in the funnel of each soda bottle.  The bottles will sit under the lamp for 5 minutes.
   2. Teacher will ask volunteers to share the observations they made.  The teacher will explain that she put ice cubes in the funnels of each of their soda bottles.  The teacher will ask “What do you think will happen to the air temperature near the top of the soda bottle cylinder?  Why?”
   3. The students will discuss their predictions.  After 5 minutes the teacher will instruct a student from each group to retrieve their soda bottles.  The teacher will ask “What’s happening to the bottom of the funnel inside the soda bottle cylinder?  Why?”
   4. The students will discuss their observations with the other members of their table.  Then the students will record their observations in their notebooks.  Students will illustrate their observations and use the vocabulary words to describe their illustrations.  The teacher will ask for volunteers to share their observations with the rest of the class.

**Closure/Culmination:**The teacher will ask, “Who can tell me what we learned today?”  Students will summarize the lesson.

**Extensions:**

Students will produce a creative writing piece about the day in the life of a water droplet.

**Assessment**

Teacher will circulate and monitor throughout the lesson to make informal assessments.  Use the student observations to formally assess student’s understanding according to rubric.

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|  | 4 | 3 | 2 | 1 |
| Student Understanding | • There is evidence that the student has a **full and complete** understanding of the question or problem.  • The supporting scientific evidence is complete and demonstrates a full integration of scientific concepts, principles, and/or skills. | • There is evidence that the student has a **general** understanding of the question or problem.  • The supporting scientific evidence is generally complete with some integration of scientific concepts, principles, and/or skills. | • There is evidence that the student has **minimal** understanding of the question or problem.  • The supporting scientific evidence is minimal. | • There is evidence that the student has **no** understanding of the question or problem. |
| Student Response | The response reflects a complete synthesis of information, such as data, cause-effect relationships, or other collected evidence. | The response reflects some synthesis of information, such as data, cause-effect relationships, or other collected evidence. | The response provides little or no synthesis of information, such as data, cause-effect relationships, or other collected evidence. | The response is completely incorrect or irrelevant or there is no response. |
| Terminology | The accurate use of scientific terminology strengthens the response. | The accurate use of scientific terminology is present in the response. | The accurate use of scientific terminology may not be present in the response. | The accurate use of scientific terminology may not be present in the response. |
| Application of Knowledge | An effective application of the concept to a practical problem or real-world situation reveals a complete understanding of the scientific principles. | An application of the concept to a practical problem or real-world situation reveals a general understanding of the scientific principles. | An application, if attempted, is minimal. | An application, if attempted, is minimal. |